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Comments:
From the SCS Chief

Changing Minds About Conservation Tillage

People don't change their minds easily, and that probably goes double for farmers and ranchers. Missourians aren't the only ones who have to be shown.

Conservation tillage is a case in point.

The Soil Conservation Service estimates that about 1 cropland acre in 4 was farmed this year under some form of conservation tillage. Only 1 acre in 40 was under no-till. These statistics mean that most American producers still have to be sold on these new farming methods. It's going to take time, persistence, and patience on the part of SCS and district "salespeople."

My experience has been that people come to trust new farming practices a little at a time. What we have to do is keep repeating our messages about the benefits of conservation tillage and no-till, month after month, year after year. We also need to communicate to farmers any new research on conservation tillage promptly and to stay abreast of new technology.

But most of all, we need a continuing flow of fresh ideas for selling conservation tillage, with much more emphasis on local publicity, local testimonials, local radio appearances, and local tours and demonstrations. Supporting materials for these activities will be coming from SCS information people, but the actions that really count will have to occur at the grass roots.

Recently I saw a photo on the front page of an Illinois weekly showing the district conservationist standing on his head. The caption read: "I'll do anything to get farmers to try no-till."

So will I, but I suspect we'll have to do a lot more than that.

Peter Myers

Cover: This field on Ernie Behn's farm in Iowa is in its 13th year of ridge tillage. See articles beginning on page 8. (Photo, Gene Alexander, audiovisual production specialist, SCS, Fort Worth, Tex.)

John R. Block
Secretary of Agriculture

Peter C. Myers, Chief
Soil Conservation Service

All programs of the U.S. Department of Agriculture are available to everyone without regard to race, creed, color, sex, age, or national origin.

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News Briefs

Nation's Capital Becomes Conservation District

The creation of a soil and water conservation district in the District of Columbia will help focus attention and facilitate correction of the city's erosion, drainage, and sedimentation problems, says Ernest L. Moody, Soil Conservation Service district conservationist assigned to the city.

Mayor Marion Barry signed Bill 4–82, the "District of Columbia Soil and Water Conservation Act of 1982" on July 12. Introduced by Councilman Jerry A. Moore, Jr., the act establishes a soil and water conservation district which is unique among the Nation's 3,000 conservation districts in that it is the only one that is completely urban.

"Most people associate soil and water problems with agricultural land or suburban areas undergoing development," says Moody. "We also have them in the city. For instance, the unstable soils underlying the northeast and southeast sections of the city cause many erosion and soil slippage problems. In Northwest Washington, there are a lot of drainage problems caused by streams which have been filled in and covered over. The Department of Recreation alone has identified over 100 sites on its property where erosion is a problem."

Sediment control on construction sites would also come under the purview of the new soil and water conservation district. Runoff carrying eroded soil, road salts, and other nonpoint pollutants are a prime source of pollution of the Anacostia River. "If we can control erosion and storm water runoff, we can go a long way to improving water quality in both the Anacostia and the Potomac Rivers," Moody says.

The new conservation district replaces the old Resources Advisory Committee, which has been guiding soil and water conservation efforts since 1974. The new district should be more effective in solving conservation problems, says Moody, because it elevates responsibility for soil and water resources to the level of agency head. This, he said, should help coordination and communication among agencies concerned with the city's soil and water resources and eliminate duplication of effort.

The governing board is made up of the directors of the city departments of environmental sciences, transportation, and recreation; the assistant city administrator for planning and development; one mayoral appointee; and two council appointees.

A citizens advisory committee, comprised of a neighborhood commissioner from each of the eight wards, will consult with the governing board. Cooperating agencies include the Soil Conservation Service, National Park Service, and Cooperative Extension Service.

Katherine C. Gugulis,
public affairs specialist, SCS,
College Park, Md.

SCS District Conservationist Ernest Moody (right) and District of Columbia Department of Environmental Services Landscape Architect Richard Brillantine review plans to reclaim eroded areas in the Ft. Lincoln area of Washington, D.C.

Photo by Tim McCabe, visual information specialist, Public Information, SCS, Washington, D.C.

Rural Economy Isn't What It Used To Be

Rural America now offers a highly diversified, service-oriented economy in which most residents look off the farm for their livelihood.

Farm and farm-related employment has declined steadily in the postwar period, according to Ed Smith and Herman Bluestone of USDA's Economic Research Service. By 1979, less than 13 percent of those employed in nonmetro areas worked in a farm-related job, compared with 30 percent in 1950.

Even farm families have become less dependent on farming for their total income, the two economists note. Since 1966, the nonfarm income of the average farm family has exceeded net farm income in every year except 1973 and 1974.

By 1980, nonfarm sources provided 62 percent of the average farm family's income. The percentage was higher for families on smaller farms, and lower for those on larger farms.

Another indicator is the number of counties where at least 20 percent of residents' income comes from farming. Since 1950, this number has dropped from over 2,000 counties (with 69 percent of the total nonmetro population) to under 700 (with only 14 percent of the nonmetro population).

Farm output is nearly two-thirds higher than it was in 1950, so agriculture is not a declining industry. The primary reason for reduced farm employment, less dependence on farm income, and fewer farm counties is that the farmer's productivity has increased so rapidly. In 1950, one farm worker produced enough to supply 15 people. Today, one farm worker produces enough for 78 people.

Adapted from an article in *Farmline*, vol. III, No. 5, June 1982.

Delaware Studies Small Farms

Four major problems cited by small farmers in Delaware include high costs, not enough open land to farm, not enough operating money, and too much time taken by nonfarm jobs.

These findings are in a study of 102 small farm operators in Delaware. The study was done by Steven Hastings and R. Dean Shippy, Department of Agricultural and Food Economics at the University of Delaware. Twenty-two farmers rated the Cooperative Extension Service as their first choice for farm information, 25 rated feed or seed dealer salespeople, 17 rated their neighbors first, and 16 listed magazines and newspapers.

Off-farm employment was reported by 65.7 percent of the small farm operators with 64 percent earning more than $15,000 in 1980. Of the 102 farm operators surveyed, 84 had spouses. Of these, 35.7 percent were employed off the farm in 1980 and 64 percent of these reported incomes in the $2,501 to $10,000 range.

The survey coincided with others showing that small and part-time farmers tend not to use government agencies. A total of 63.7 percent had not asked for or received assistance during the previous 3 years from USDA's Agricultural Stabilization and Conservation Service, Extension Service, or Soil Conservation Service. For the most part, they are living on small farms by choice rather than because of lack of alternatives.

Single copies of the report are available from Mail Room, College of Agricultural Sciences, University of Delaware, Newark, Del. 19711. Ask for Bulletin No. 438.

Small Farms Can Be Successful

A small farm in Vermont is apt to be shabby, burdened with debt, and generally unsuccessful.

If that's your view of small farming in Vermont, it doesn't match the material uncovered during a study of small farms in the State by researchers at the Experiment Station of the College of Agriculture, University of Vermont.

According to the report by Raymond Tremblay, an agricultural economist, and Donna F. Dunn, a graduate research fellow, in the Department of Agricultural and Resource Economics, small-farm operators had high investments but were relatively debt free.

The reason, Tremblay said, is that most small-time farmers had off-farm employment and other income. And most of the on-farm work was done by members of the farm family.

More than half of the farmers studied had more than 20 years' experience, which, Tremblay noted, does not support the general idea that only young people new to farming are the small farmers.

More than half the farms studied operated at a loss, the researchers reported. However, some operators owned their farms for intangible income, and many had substantial land holdings even though much of it was of marginal agricultural use.

Nearly all the farmers reported they planned to continue farming and were optimistic about their potential. Only about half said they planned to expand their operations to improve their income.

The researchers noted that the 1974 census of Vermont agriculture listed small farms as accounting for nearly half of all farms in Vermont, but they sold only 7 percent of the value of agricultural products. They were less efficient because 9 percent of the dollars spent were for farm production, Tremblay said.

Copies of "Small Farms in Vermont," Research Report 15, are available from Publications, Morrill Hall, University of Vermont, Burlington, Vt. 05405.

Documentary Film Available

The Price of Abundance is a 16mm color film focusing on the debate emerging within agricultural circles over whether this Nation is heading toward a major food production crisis.

At the heart of the problem are farmers motivated by financial realities to intensify their use of the land, which hastens the depletion and degradation of our Nation's soil and water resources.

Narrated by actor Eddie Albert, the 29-minute film focuses on a Midwest family who is aware of the value of our precious topsoil and the economic pressures that modern farming has produced. The reflections of this family are highlighted in the film, which is interspersed with comments from agricultural economists, scientists, and consumer representatives.

In short, the film bears upon us to make wise land use related decisions, which, in the long run, will benefit our whole civilization.

For more information about the film contact Shawnee Resource Conservation and Development Area, 1305 North Yale Avenue, R.R. 6, Box 255, Marion, Ill. 62959; or phone (618) 997–4415.

Earth's Rays Give Clue to Snow Cover, Spring Flooding

Meteorologists are using a Geiger counter to predict floods in the Midwest and help the Soil Conservation Service predict erosion and moisture conditions on cropland.

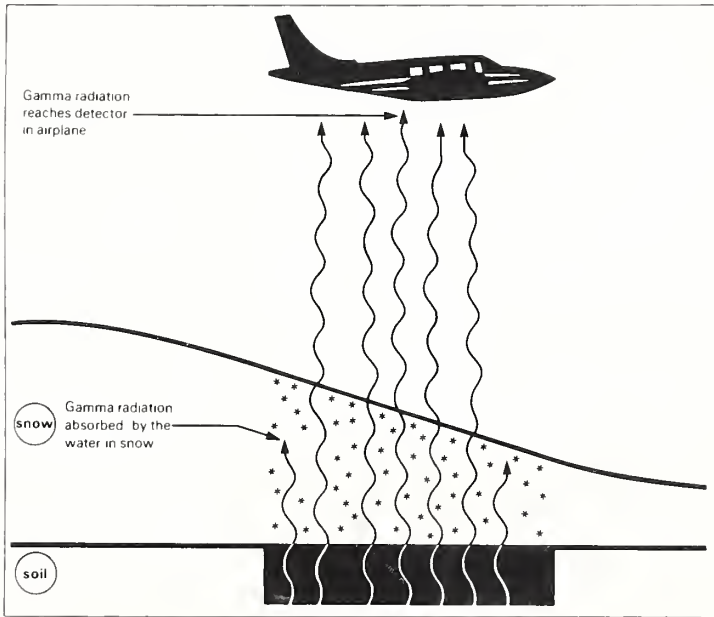
In 1969, record, unpredicted floods from snowmelt in the Mississippi and Missouri River Basins dramatized the unreliability of data from ground samples and pushed meteorologists from the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce, to find a way to survey large snowfields quickly and accurately.

They developed a supersensitive airborne Geiger counter that measures natural radiation emitted from the earth, primarily from the upper 8 inches of soil. Both snow and soil moisture weaken the rays as they pass through, so the meteorologists can tell how much water is in the snow and in the soil by the strength of the rays.

Pilots fly low over North and South Dakota, Nebraska, and Minnesota, on prescribed flight lines, to get an average of the amount of snow water over a large area, which is impossible with ground surveys. SCS agreed to work cooperatively with NOAA to collect and analyze soil samples along the flight lines so NOAA could adjust its instruments to account for the effects of soil moisture. In return, NOAA will share its data with SCS.

While heavy rainfall or high temperatures late in the season might still thwart the Midwestern meteorologists, late-spring snowstorms will never again upset their predictions. All they have to do is send the airplane up to have another look at the snowfields after the storm.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.



An instrumented plane flying at 500 feet measures the amount of natural radiation blocked by the snow to give an estimate of snow-water equivalent on the ground.

Photo courtesy of NOAA.

Wire Screens Slow Erosive Force of Irrigation Water

Gary McClellan, a dairy farmer in Vale, Oreg., has invented a device that turns high-powered, erosive irrigation jets into quietly bubbling streams that slowly soak into the soil.

McClellan invented the device because he got tired of seeing his fields progressively eroded by the hard, thin, cutting streams of water flowing through the gates of his irrigation pipe. These jets of water can cause tremendous erosion damage—especially when used on hilly fields and loose soils—within a few hours.

McClellan attaches the device, a screen made of layers of wire mesh, to the top of each gate on his irrigation pipes, with a screw. McClellan said "the screw in the top goes at an angle and locks the screen in place" when the water pushes against the screen. "I've never had any fall off, even in some of the big wind storms that go through here. They're also light enough that I can easily carry a hundred at a time.

"I usually open about 100 gates at a time. I have screens on those gates and then I put screens on the 100 gates above those. So, as I close the lower gates and the water starts flowing out the next gates, the screens are already in place. As I close the gates, I pick up the screens, move past the new section being irrigated and place them on the next 100 gates," McClellan said.

"The screens are virtually indestructible. If one gets smashed, I just bend it back into shape. At first I worried about them getting plugged up with material carried in the irrigation water. But, I've found that the material migrates toward the center of the screen and that the water just spreads out a little more over the entire screen surface. And, too, as soon as a screen dries a little, any foreign matter falls right out," he said.

The high cost of other devices, such as butterfly valves, pushed McClellan into experimenting for 2 years until he built his inexpensive screen. Although he originally made the screens just for himself and a few neighbors, word of the device spread quickly. He soon was getting calls from around the county, then the State, and finally from as far away as Nebraska. Now McClellan earns extra income by making a screen every 12 minutes—a screen that makes soil conservation more affordable.

Adapted from an article by Dick Yost in the March/April 1982 issue of *The New Farm*.

Farmer Gary McClellan solved an erosion problem caused by the force of flow from his irrigation pipe (above) by designing a wire mesh screen (right) to soften the flow.

Conservation for a Hillside Orchard

by Joseph A. Neafsey

Gardner Chapman has been in business for only 6 years, but he already has made a success of his "pick-your-own" apple and peach orchard. His Johnny Appleseed Farm contains more than 13,000 Full-Dwarf apple trees and 2,500 peach trees on 120 acres of steeply sloping land in Ellington, Conn.

Before becoming an orchardist, Chapman worked in the sheet-metal and construction trade. "But I've always wanted to be a farmer," he said. "When I tired of the hassles in the construction business, I decided to venture into fruit-tree cultivation." He is a member of the International Dwarf Fruit-Tree Association and has attended its meetings throughout the East.

"I'm constantly learning—from books, consultants, and seminars," he said. "It is an incredibly complicated business. Management and cultivation techniques sometimes change in just a few years, and new varieties of fruit are constantly being developed."

Chapman has carefully selected his cultivation practices to assure success. He knows that each variety of tree needs a certain amount of water, specific nutrients, and scheduled maintenance.

One practice Chapman chose to meet these needs is drip irrigation. His drip irrigation system draws water from two wells, mixes in nitrogen and other nutrients, and pumps it through an underground system of polyethylene pipes. A timing mechanism at the pumps regulates the amount of water that flows into each zone of the orchard during a certain period of time. After one zone receives its allotment of water, the pumping mechanism shuts off and switches to feed a second zone. As water flows in the pipes down each row of the orchard, a small emitter at the base of each tree discharges the desired ration of water, up to 1 gallon per hour, for each tree.

Another practice Chapman has been using is trellises to support the fruit-bearing branches of his apple trees. The 6-foot-high trellises are made of 5-inch-diameter poles set at 15-foot intervals along each row. Lines of thin-gage wire span the distance between each post. The wire is spaced every 12 inches up the poles and is rust proof to protect the tree limbs. From each line hang vertical strands of light chain to which the tree branches are clipped. This network of wire strands holds the tree limbs at 40-degree angles, which permit optimum efficiency of tree and fruit growth. Most of the trees in the apple orchard are trellised in this way, but some varieties remain free standing. Trellises also eliminate the need for ladders and, according to Chapman,"they keep people in line."

Chapman says the key to his success has been conservation planning. "Conservation measures are a must," said Chapman. "I knew that on this open, sloping land I would need some type of water control."

He became a cooperator with the Tolland County Soil and Water Conservation District and worked with Soil Conservation Service specialists to develop a plan to control and safely remove excess surface and subsurface water throughout the year.

A fruit-laden tree testifies to the success of drip irrigation and trellises at the Johnny Appleseed Farm.

Chapman has installed a system of diversions and waterways that safely remove the runoff from heavy rains and snowmelt. These structures slow the velocity of surface water, thus reducing the potential for erosion. The flow is safely redirected into a wide, stone-lined waterway, which winds down the lower section of the hillside. Stone embedded in the waterway will prevent the channel from eroding. Well-established sod of 'Kentucky 31' tall fescue in and alongside the waterway will help keep the soil in place and stabilize the banks of the waterway.

Peach trees grow best in well-drained soils and proper removal of subsurface water is critical. But on Chapman's land, an impermeable layer of compacted subsoil—known locally as hardpan—prevents water from penetrating below 2 or 3 feet. If water saturated the soil around the peach tree roots for even a few days, the roots could die from lack of oxygen. To counter this situation, Chapman has installed more than 6,000 feet of subsurface drainage tubing to remove excess water and conduct it to an outlet in the stone-lined waterway.

Although they have been in business only a short time, Gardner Chapman and his family, through careful planning, have built the orchard into a successful "pick-your-own" operation. Tractors and oxen-pulled wagons carry customers up the hillside where they wander through the orchard, pick the fruit they prefer from among more than a dozen varieties of apples and peaches, and enjoy the outstanding view of the Connecticut River Valley.

Joseph A. Neafsey,
district conservationist, SCS, Vernon, Conn.

Ridge Tillage

by Donald L. Comis

No-Till Moves to High Ground

Farmers may have found the key to better performance from conservation tillage in the northern Corn Belt: ridge tillage.

Ridge tillage is planting on top of ridges while leaving the previous crop's residue in the furrows between ridges. Planting on ridges is not new. Farmers have been doing it for more than 60 years, mainly on irrigated land in the South and West, but only in the past 20 years have farmers begun to combine it with residue management to preserve moisture and prevent erosion.

Twenty years ago, a small, family-owned farm equipment manufacturer began selling a planter that plants on ridges without any previous tillage. It sweeps about 2 inches of topsoil off the ridge and pushes the soil and residue between the rows, with trash guards, to plant in a cleared seedbed.

The University of Nebraska worked with the manufacturer to develop the planter as a way to combine ridge planting and residue management. Together they developed a tillage method that is good for row crops grown in wet, poorly drained soils that need some tillage to dry out the topsoil and warm it to the proper temperature for seed germination. The raised seedbed dries and warms up faster than a level seedbed so ridge-till farmers can sometimes plant earlier than conventional farmers.

The ridges make a good seedbed but can be damaged by livestock and vehicle traffic, so farmers must keep livestock off the fields at certain times and lay out fields carefully to avoid crossing the ridges with equipment.

Ridge tillage reduces the rate of compaction by increasing organic matter in the surface soil, reducing the number of trips across a field, and restricting traffic to the same tracks every year. By eliminating heavy tillage operations, it also saves equipment costs, fuel, time, and labor. Ridge-till farmers often chop cornstalks, plant, and then cultivate once or twice a season to remove weeds and build up the ridges. Some farmers like the easy cultivation option because they don't want to depend solely on chemicals. This, along with the chance to spray just on the ridgetops, allows them to use chemicals more efficiently.

The cultivation and the scalping of the ridgetop before planting bury some of the residue, removing some of the erosion protection the residue offers. But farmers can leave more residue on the surface by taking the sweeps and trash guards off their planters and planting into the unscalped ridgetop, no-till fashion.

Arnold King, the national tillage specialist for the Soil Conservation Service, says a few farmers in the Midwest have done this and he expects many more to use the ridged till-plant system as a steppingstone to no-till on ridges.

The Indiana Experience

Inspired by Iowa farmer Ernie Behn in 1978, Soil Conservation Service District Conservationist Mel Boyer decided the time had come for Wabash County, Ind., to try ridge tillage, also known as till plant on ridges.

The Wabash County Soil and Water Conservation District put Behn's words to work immediately, leasing equipment and hiring an operator to plant just under 300 acres a year on small demonstration plots for 3 years. Last year, they decided to continue for another 3 years.

Last spring, 10 Wabash County farmers used their own planters to plant 3,200 more acres on ridges and Boyer expects this to double next spring.

USDA's Agricultural Stabilization and Conservation Service has helped SCS and the conservation district by sharing costs for many of the demonstration plots

Scenes from Wabash County, Ind., show first cultivation of corn in till plant system (above) and second year of till planting in unchopped corn residue (right).

and USDA's Extension Service has helped promote ridge tillage.

Other Indiana districts have followed Wabash's lead and are leasing ridge tillage equipment for their own demonstrations, inspiring farmers throughout the State to buy equipment.

Boyer said ridge tillage may be the best conservation tillage option for north-central Indiana, one-quarter of Indiana's land, because of its poorly drained soil. In fact, ridge tillage is adapted to most of the soils in Indiana, from poorly drained to excessively drained.

Farmers have been slow to turn to ridge tillage before these demonstrations because they didn't know about it and had no models in their own areas.

Another problem cited by Boyer is the reluctance of farmers who have invested in a complete line of tillage equipment to sell the machines and buy ridge tillage equipment.

Until last year, even farmers ready to buy new machines would have had a hard time finding ridge tillage equipment outside of the Nebraska area because only one company made the equipment. Now there are two companies, which are actively competing for sales throughout the Midwest.

But the main obstacle is the farmer's mind, not the availability of machines, according to a representative of one of the two companies. This official said farmers had closed their minds to farming with ridges and residue; but he believes that economic and environmental pressures have begun to open their minds in the past 2 years, as they look for new ways to save money and soil.

Farmers can't afford not to switch equipment, this representative maintains. He gave the example of a debt-ridden farmer who sold almost $100,000 worth of equipment, bought a planter and a cultivator for ridge tillage, and reduced his debt enough to save his farm.

Kevin Cordes is a young Wabash County farmer who agrees. Cordes began ridge tillage after his conservation district demonstrated it on his land for 2 years. Cordes had purchased his father's old, worn equipment when he started farming and didn't want to borrow money at a high interest rate for new equipment he didn't need. Instead, he bought a used cultivator and built ridges during summer 1980. That winter he bought a new planter and, since spring 1981, he has grown 300 acres of corn and 150 acres of soybeans on ridges.

He says his yields are better on ridges than on the 50 acres he plows. His soil is getting looser every year and his corn roots are reaching further down. This summer, his corn plants survived hot, dry weather without any visible damage while the leaves of his neighbor's cornstalks rolled up and wilted.

Besides better yields, Cordes says his expenses and soil erosion are down. With better crops and a lower investment in equipment at a time when interest rates are up and crop prices are down, Cordes says he is in a better financial situation than he would have been if he hadn't switched to ridge tillage.

Photos by Mel Boyer, district conservationist, SCS, Wabash, Ind.

Ridge Tillage in Michigan

In Michigan, farmers and conservationists are "checking out" ridge tillage as an alternative to fall plowing the State's flat, fine-textured, poorly drained soils.

Michigan farmers are interested in ridge tillage because planting on ridges, built when the previous crop was cultivated, is a conservation tillage system that will let them get their crops planted at the right time and when soil moisture conditions are right. Because the ridges are a few inches higher, they dry out and warm up sooner than the land between the ridges. Conservationists are interested in

ridge tillage because only a narrow strip is disturbed when crops are planted and all residue from the previous crop is left on the surface between the rows.

Early in 1981, to encourage effective conservation tillage, the Soil Conservation Service in Michigan issued a position statement. The position statement, that clearly favored no-till and paved the way for a 68-percent increase in no-till last year, recognized the need for and encouraged conservation tillage systems that reduced soil erosion.

"Our goal is to control soil erosion. Ridge tillage is a conservation tillage alternative to be considered when we are helping farmers select a resource management system to solve a particular problem. Ridge tillage, like no-till and other conservation practices, will not fit all situations. But, when it does fit, it may be the best solution," said Homer R. Hilner, Soil Conservation Service State Conservationist. "I'm anxious to see the results of evaluations being made by the Genesee and other soil conservation districts," he added.

The Genesee Soil Conservation District did in Michigan what Wabash County did in Indiana—introduced the ridge tillage concept.

Mike Thorne, SCS district conservationist for Genesee County, visited Wabash County with Genesee Soil Conservation District (SCD) Director Frank Atherton and SCS Conservation Agronomist Jerry Lemunyon to take a look at ridge tillage. They were impressed with what they saw and, in fall 1980, the Genesee SCD began a program similar to Wabash's. The district leased a ridge-till cultivator, built ridges on 230 acres for 14 farmers, and firmed up plans for a 3-year study of ridge tillage. In spring 1981, farmers planted the first ridge-till soybeans and corn to be grown in Genesee County. The district and the farmers involved were pleased with the results.

Farmers and conservationists from other conservation districts have visited the Genesee trials and some have started their own ridge-till studies.

In nearby Gratiot County, Joe Lauer and sons, John and Will, decided to try ridge tillage on their compacted soil. The Lauers had 10 acres of navy beans planted on ridges this past spring. They have since built ridges for 1,100 acres of corn, soybeans, and navy beans. Next spring, using a 12-row ridge-till planter they built this past summer, they will plant 1,100 acres on ridges. The Gratiot SCD will use the Lauer farm to show other Gratiot County farmers how ridge tillage works.

In Clinton County, where the soil conservation district and SCS District Conservationist Jim Squires have built a strong no-till program, the district has decided to give ridge tillage a thorough evaluation. Squires, accompanied by local farmers and district directors, visited Genesee County to learn more about ridge tillage. As a result, the Clinton District decided to lease a ridge-till cultivator. Fourteen Clinton County farmers have built ridges on more than 2,000 acres this year using the district's equipment or their own cultivators.

Mike Thorne says some farmers like the ridge tillage concept, perhaps because they can see how planting on ridges will help them get their crops planted on time. Thorne sees ridge tillage as one of the better practices on many of the soils in Genesee County and perhaps eastern lower Michigan.

Jim Squires said, "Farmers who don't need the benefit of ridges should use a no-till planting system; but where no-till is not the best solution, ridge tillage may be the best alternative conservation tillage system. And sometimes," he added, "ridge-till is a step toward good no-till."

Dwight Quisenberry, Michigan SCS agronomist, agrees that ridge tillage is well suited for the flat, fine-textured, poorly drained soils found in Genesee County and in many fields in southeast Michigan, such as those farmed by the Lauer family.

Quisenberry, who believes that with the right management no-till is a feasible planting system in most situations, is confident that ridge tillage is another step away from clean tillage. The erosion specialist warns, however, that trying to use the ridge tillage system on long slopes without other conservation measures to support it, might result in more erosion rather than less.

Donald L. Comis,
assistant editor, *Soil and Water Conservation News*, SCS, Washington, D.C.

Roger Howell,
public affairs specialist,
SCS, East Lansing, Mich.

Behn Book on Ridge Tillage Available

"More Profit With Less Tillage," a newly revised paperback book, describes Ernie Behn's personal journey, over a 15-year period, from fall plowing to chisel plowing to ridge tillage on his Iowa farm. Behn is a retired Soil Conservation Service district conservationist who travels around the Midwest to spread the word about ridge tillage, when he's not farming or writing.

Behn suggests other farmers might have more time to have fun if they gave up the frantic pace of fall plowing, which he calls the rural rat race.

Behn is so positive about ridge tillage and so tired of hearing complaints about it that he's turned the tables in this book. He lists 20 advantages of ridge tillage and 16 disadvantages of clean tillage.

This book is available for $7.95 plus $1.25 for mail orders, $2.25 for UPS, from Wallace Homestead Book Company, 1912 Grand Avenue, Des Moines, Iowa 50305. Orders may be placed by phone at 515–243–6181 and charged to Master Card or Visa. Or order copies for $7.95 plus $1.25 postage and handling directly from Ernie Behn, Rt. 1, Boone, Iowa 50036. Prepayment not required for an order from Behn.

New Publications

Modern Irrigated Soils

by David W. James,
R. John Hanks,
and Jerome J. Jurinak

This reference/text provides an easily understandable introduction to the theory and practice of managing irrigated soils by controlling soil moisture, salinity, and fertility. The book explains how soil and water of marginal quality can be effectively managed to create sustained crop production in areas where this would not be normally feasible.

After giving a brief overview of the history of irrigation, the book goes on to detail such topics as moisture availability and factors affecting evaporative demand; methods for characterizing salinity-sodicity; salted soil prevention and reclamation; soil fertility factors; and methods for scheduling irrigation.

With its many graphs and illustrations as well as study guides at the end of each chapter, this book will prove a valuable resource for irrigation agronomists and engineers, irrigation farmers, professors and students of agronomy, and all those concerned with the topic of irrigated soils.

This book is available for $30 plus postage, from John Wiley & Sons, Inc., One Wiley Drive, Somerset, N.J. 08873.

Feed and Fuel from Ethanol Production

Edited by R. A. Parsons

This 101-page publication contains the proceedings of a seminar on the title subject held in Philadelphia, Pa., in September 1981.

Included in the publication are sections on ethanol production, handling wet byproducts, feeding the byproduct, and using ethanol.

Copies are available for $2 from Northeast Regional Agricultural Engineering Service, Riley Robb Hall, Cornell University, Ithaca, N.Y. 14853.

Humus Chemistry

by F. J. Stevenson

This book can serve as a reference text in soil organic matter chemistry and soil biochemistry. Its emphasis on the basic organic chemistry and reactions of naturally occurring organic substances in the environment also makes it a valuable reference for researchers in soil science, geochemistry, sanitary engineering, environmental science, and related fields.

Along with the 443 pages of text are 138 figures and 87 tables.

This book is available for $37.50 from John Wiley & Sons, Inc., One Wiley Drive, Somerset, N.J. 08873.

Managing Animal Wastes: Guidelines for Decisionmaking

by L. A. Christensen,
J. R. Trierweiler,
T. J. Ulrich, and
M. W. Erickson

Increased environmental regulations, rising energy costs, and rising fertilizer costs are forcing livestock farmers to rethink their attitudes toward livestock waste management. This report discusses the economic issues that planners should consider when analyzing livestock waste management systems. It demonstrates the need for economic concepts and procedures in typical livestock producing situations. Six examples from diverse types of livestock operations throughout the United States illustrate the selection process. The sample operations include a Lake States dairy farm, a southwestern and a southeastern dairy farm, a Corn Belt hog operation, a Corn Belt operation for totally confined hogs, and a Corn Belt farmer-feeder operation.

Single copies of this report (ERS–671) are available free by writing USDA, Economic Research Service, Washington, D.C. 20250.

Soil Degradation

Edited by D. Boels,
D. B. Davies,
and A. E. Johnston

This publication is a collection of papers presented at a seminar organized in Wageningen, Netherlands, by the Institute for Land and Water Management Research and the International Agricultural Centre. The coverage is divided into two major sections—physical soil degradation, and losses and accumulation of organic matter in the soil. These topics are covered in depth by experts from throughout the European community. A third section outlines the conclusions and recommendations presented at the seminar.

This volume offers a complete overview of European research into techniques for coping with problems of soil degradation.

It is available for $6 plus shipping and handling from Merrimack Book Service, 99 Main Street, Salem, N.H. 03079.

Acid Rain Bibliography

by the U.S. Environmental Protection Agency

The Corvallis Environmental Research Laboratory in Oregon has assembled a collection of more than 4,000 documents dealing with topics related to acidic deposition. This complete alphabetical list of all collected titles/citations includes material from as early as 1911. The collection also includes material on Europe and Canada.

This bibliography is available in a variety of ways. The list of all titles/citations (most with abstracts) and an authors' index are available free on microfiche. The bibliography also is available in a double volume of 1,110 pages for $71.70, and a shorter version (no abstracts) for $36.81. For further information contact Danny L. Rambo, U.S. Environmental Protection Agency, 200 SW 35th Street, Corvallis, Oreg. 97333.

Resource Conservation Glossary

by the Soil Conservation Society of America

This third edition includes 4,000 terms commonly used in some phase of resource management. Terms from 34 technologies are represented.

While most professionals and researchers have specialized glossaries, this glossary will be useful to them as they encounter interdisciplinary activity.

Some of the technologies represented in this edition include agronomy, biology, conservation education, erosion and sedimentation, irrigation, plant materials, and waste management.

This glossary is available for $7 ($6 for SCSA members) from the Soil Conservation Society of America, 7515 Northeast Ankeny Road, Ankeny, Iowa 50021.

A Bibliography of Cooperative Extension Service Literature on Wildlife, Fish, and Forest Resources

by the Cooperative Extension Service

The purpose of this bibliography is to provide a ready reference source for those interested in the conservation and management of wildlife, fish, and forest resources.

The literature referenced in this 42-page bibliography consists exclusively of material generated by extension specialists.

The intended users of this publication include extension specialists, educators, and natural resource managers and administrators at the local, State, and national levels. However, private landowners and the general public will also find it useful.

A limited number of single copies are available from the Natural Resources Unit, Extension Service, U.S. Department of Agriculture, Washington, D.C. 20250.

New Publications

The Great Plains Conservation Program

by the Soil Conservation Service

The Great Plains Conservation Program (GPCP) offers long-term technical assistance and cost-sharing through SCS. This full-color pamphlet gives a brief history of how the GPCP was created, how the program works, what it has accomplished, and what the program can do for landowners who sign contracts with USDA.

Photographs show some of the conservation practices used under a GPCP contract.

For a copy of this pamphlet, Program Aid No. 1317, contact your local or State Soil Conservation Service office.

Research for Small Farms

Edited by Howard W. Kerr, Jr., and Lloyd Knutson

This 301-page publication is a compilation of papers presented at a symposium held in November 1981, sponsored by the Agricultural Research Service's Beltsville Agricultural Research Center in Beltsville, Md. The purpose of the symposium was to identify research needs, report research achievements, build rapport between involved parties, provide information for small farmers, and record the status of various efforts to enhance the well-being of small farms.

Each paper was presented by an expert in a particular field. Some of the sessions included papers on the status and research needs of small farms; horticulture—emphasizing vegetables, fruits, and berries; livestock and forage; and socio-economic, marketing, and family considerations on the small farm.

Single copies of this publication (Misc. Publ. No. 1422) are available from U.S. Department of Agriculture, Agricultural Research Service, Washington, D.C. 20250.

Ponds—Planning, Design, Construction

by the Soil Conservation Service

This 51-page color handbook describes two types of ponds, the embankment pond and the excavated pond, and outlines the requirements for building each. It can be useful to landowners for general information and also serves as a reference for engineers, technicians, and contractors.

The handbook is well illustrated with many photos, charts, drawings, maps, and graphs.

A single free copy of Agriculture Handbook No. 590 may be obtained from your local or State Soil Conservation Service office or a copy may be purchased for $5 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Cost Data for Landscape Construction, 1982

The third edition of this publication has 264 pages of completely revised and updated cost information for landscape architects, engineers, cost estimators, and property managers. The information is designed to be used primarily by designers and cost estimators for preparing cost estimates for projects that will be bid competitively. Costs are presented in terms of both general "composite costs" for quick preliminary estimates, and specific "basic costs" for detailed final estimates. New for this edition are installed costs for pedestrian bridges, shoring, interlocking pavers, stamped concrete paving, and low voltage lighting.

Eighteen appendixes bring together useful formulas and data to aid the estimator. Revised labor rate adjustment factors for 23 metropolitan areas are provided.

Copies of this publication are available for $27.50 from Kerr Associates, Inc., Suite 100, 1942 Irving Avenue South, Minneapolis, Minn. 55403.

Selected Proceedings of the Midwest Conference on Wetland Values and Management

by the Freshwater Society

Developed from the 1981 conference by the same name, this publication is an up-to-date collection of resource information from leading national authorities in the field of wetland management and research. The 643-page publication, nationally unique in its focus on freshwater wetlands, contains over 73 presentations and abstracts on a variety of wetland issues ranging from wildlife and agricultural values, hydrology, and impact of losses to legal and economic issues.

This publication is a valuable resource tool for economists, engineers, wildlife managers, urban and city planners, and many others concerned about the management of wetlands.

It is available for $30 from the Freshwater Society, 2500 Shadywood Road, Box 90, Navarre, Minn. 55392.

Dam Safety—Who Is Responsible?

The National Association of Conservation Districts has prepared a brochure and a 21–minute slide/tape show emphasizing dam safety responsibilities of the owners of dams. The brochure lists the factors that make a dam safe or unsafe, proper maintenance by the dam owner and liability for damage to homes and businesses due to dam failure, and responsibilities of Federal, State, and local government.

The brochure and the slide/tape show are good documents for informing the public of their responsibility and the importance of a strong State dam safety program.

Both are available to all interested groups, businesses, and individuals by contacting the local soil conservation district office or State soil conservation agency.

Recent Soil Surveys Published

by the Soil Conservation Service

Florida: Pasco County.
Georgia: De Kalb County.
Indiana: Starke County.
Kansas: Coffey County and Nemaha County.
Kentucky: Green and Taylor Counties.
Maine: York County.
Nebraska: Custer County.
North Carolina: Currituck County.
North Dakota: Dunn County.
Oregon: Washington County.
Pennsylvania: Schuylkill County.
Texas: Jasper and Newton Counties.
Utah: Rich County.
West Virginia: Marion and Monongalia Counties.

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